DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

REPORT

OF THE

DEPARTMENTAL COMMITTEE

ON THE

DECLINE OF DAIRYING IN IRELAND.

Presented to Parliament by Command of His Majesty.

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1920.

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TO HIS EXCELLENCY JOHN DENTON PINKSTONE, VISCOUNT FRENCH OF YPRES, K.P., G.C.B., O.M., G.C.V.O., K.C.M.G., FIELD MARSHAL, LORD LIEUTENANT-GENERAL AND GENERAL GOVERNOR OF IRELAND.

MAY IT PLEASE YOUR EXCELLENCY,

I am desired by the Vice-President to submit to Your Excellency the Report of the Departmental Committee on the Decline of Dairying in Ireland.

I have the honour to remain,
Your Excellency's faithful Servant,
T. P. GILL,
Secretary.

DEPARTMENT OF AGRICULTURE
AND TECHNICAL INSTRUCTION FOR IRELAND,
DUBLIN, 11*th June*, 1920.

DUBLIN CASTLE,
22*nd June*, 1920.

SIR,

I have to acknowledge the receipt of your letter of the 11th instant, forwarding, for submission to His Excellency the Lord Lieutenant, Report of the Departmental Committee on the Decline of Dairying in Ireland.

I am,
Sir,
Your obedient Servant,
JAMES MACMAHON.

The Secretary,
Department of Agriculture and
Technical Instruction for Ireland,
Dublin.

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DEPARTMENTAL COMMITTEE ON THE DECLINE OF DAIRYING IN IRELAND.

COPY OF MINUTES APPOINTING THE COMMITTEE.

I HEREBY nominate and appoint a Committee to inquire into and report upon the causes of the decline of dairying in Ireland, and to submit recommendations with a view to the improvement of the supply of milk and of milk products in this country.

The Committee will consist of the following :—

BERTRAM H. BARTON, D.L.,
Straffan House, Straffan, Co. Kildare (*Chairman*) ;

ROBERT A. ANDERSON,
Secretary, Irish Agricultural Organisation Society,
The Plunkett House, Dublin ;

HAROLD A. M. BARBOUR,
Strathearne, Dunmurry, Co. Antrim ;

THOMAS DUGGAN, J.P.,
The Castle, Two-Mile-Borris, Thurles.

(Signed), HUGH T. BARRIE,
Vice-President,
Department of Agriculture and Technical Instruction for Ireland.

Dated this 11th day of September, 1919.

I also nominate and appoint the following to be members of the Departmental Committee on the Decline of Dairying in Ireland :—

PATRICK BRADLEY,
President, Irish Land and Labour Association, Cork ;

ALBERT R. LOCKETT,
National Amalgamated Union of Labour, Belfast.

(Signed), HUGH T. BARRIE,
Vice-President,
Department of Agriculture and Technical Instruction for Ireland.

Dated this 22nd day of September, 1919.

DEPARTMENTAL COMMITTEE ON THE DECLINE OF DAIRYING IN IRELAND.

REPORT.

To HUGH T. BARRIE, Esq., M.P.,
Vice-President of the Department of Agriculture
and Technical Instruction for Ireland.

SIR,

By your minutes dated 11th and 22nd September, 1919, we were appointed a Committee "to inquire into and report upon the causes of the decline of dairying in Ireland, and to submit recommendations with a view to the improvement of the supply of milk and of milk products in this country."

PROCEDURE.

In accordance with these Minutes the following steps were taken with a view to obtaining evidence regarding all aspects of the dairying industry which would be as comprehensive as possible and would be representative of the different interests involved:—

(1) Advertisements and notices were issued to the Press, setting forth the objects of the Inquiry, giving particulars as to the arrangements for sittings, and inviting evidence from associations and persons interested who might desire to lay their views before us.

(2) Special letters were issued to numerous associations and societies connected with the industry, and to a number of the County Committees of Agriculture, inviting them to appoint witnesses who could furnish us with authoritative evidence on their behalf. A gratifying degree of co-operation was received in this connection and a large number of the witnesses examined were gentlemen deputed by these bodies to appear before us.

In addition to the witnesses who were present at our sittings, a number of persons who found it inconvenient to attend submitted statements of their views, which have been duly considered along with the evidence taken orally.

(3) Sittings for the purpose of hearing evidence were held in Dublin and at the following provincial centres:—

Belfast.
Coleraine.
Londonderry.
Omagh.
Enniskillen.
Cork.
Limerick.
Thurles.
Waterford.
Mallow.
Tralee.
Sligo.
Mullingar.
Galway.
Castlebar.

The sittings at Mullingar, Galway, and Castlebar were held specially with a view to obtaining evidence as to the difficulties attending the production of milk in areas of the country in which dairying generally is not a prominent feature of local agricultural industry, and as to the difficulties experienced in towns situated in such areas in securing an adequate supply of milk. The three towns referred to were regarded as typical of their class.

In all, 29 sittings were held and 206 witnesses were examined. All the sittings were open to the Press and the public, and the number of letters received as a result of Press reports indicate that a wide interest has been taken in our proceedings.

SECTION I.

IS THERE A DECLINE ?

Broadly speaking, the evidence submitted to us would show that during the past few years there has been a steady decline in the dairying industry throughout the country. Our conclusion in this respect is based on the following considerations :—

(a) *Evidence from Individual Milk Producers.*—Farmers engaged in dairying have been almost unanimously of opinion that milk supplies in their districts have been falling off for a number of years.

(b) *Milk Supplies to Creameries.*—We have obtained a very large amount of evidence as to the milk supplies to Irish creameries during the past few years, and almost without exception a decrease is recorded. The following summaries of returns furnished in this connection may be regarded as typical :—

	1916. (*Gallons*).	1917. (*Gallons*).	1918. (*Gallons*).
15 Creameries in Co. Fermanagh and adjoining counties ...	10,851,343	9,521,343	8,394,610
18 Creameries in Mid-Ulster ...	7,767,985	6,873,145	5,753,278
6 Creameries in Counties Limerick and Kerry	4,067,000	3,840,000	3,420,000

It has been estimated by the Secretary to the Irish Creamery Managers' Association that between the years 1915 and 1918 there was a decline in the production of milk in Munster of from 10 per cent. to 15 per cent., in Ulster and Connaught of from 35 per cent. to 40 per cent., and in Leinster of from 10 per cent. or 15 per cent. in County Kilkenny to 50 per cent. in Counties Wicklow and Wexford. These estimates are based on creamery records of the actual supplies received in each season.

(c) *Exports of Dairy Produce.*—The following table shows the quantities of dairy produce exported from Ireland during each of the years 1910-1919 :—

YEAR.	Butter.	Cheese.	Condensed Milk.	Milk and Separated Milk.	Cream.	Casein and Milk Powder.
	Cwts.	*Cwts.*	*Cwts.*	*Cwts.*	*Cwts.*	*Cwts.*
1910 ...	698,907	3,365	292,346	5,836	13,809	—
1911 ...	688,362	6,031	254,560	7,164	15,162	—
1912 ...	778,778	5,451	246,723	5,271	13,016	4,810
1913 ...	725,368	6,102	270,362	3,637	16,836	270
1914 ...	855,608	9,591	309,658	4,917	26,947	—
1915 ...	838,089	15,711	278,238	10,595	24,345	—
1916 ...	764,456	13,418	249,994	3,692	33,097	—
1917 ...	675,530	18,085	237,278	8,193	19,250	—
1918 ...	455,911	136,452	269,914	—	22	—
1919 ...	323,820	277,400	254,640	—	—	—

Exports reached their maximum in 1914, since which year there has been a steady decline, the figures for 1919 showing a decrease of almost 30 per cent. on those for 1914.

(d) *Census of Dairy Cattle.*—The following table shows the number of milch cows in Ireland during each year since 1910 :—

Year.	*Number of Milch Cows.*
1910	1,470,972
1911	1,468,545
1912	1,508,662
1913	1,533,517
1914	1,548,790
1915	1,509,723
1916	1,506,433
1917	1,504,033
1918	1,481,291
1919	1,471,240

The decrease in the number of milch cows is not serious, but it must be borne in mind that it has taken place in the face of restrictions on their export, and this would point to the fact that large numbers of milch cattle have been disposed of and that the breeding of such cattle has declined.

While the falling off in the supply of milk to creameries and the decreased export from the country of dairy produce appear to us sufficiently serious to justify the opinion that the production of milk has been for some years on the decline, it is not possible to base upon either of these factors any estimate of the extent of the shrinkage. In each case we consider that the decline has been due to some extent to the greatly increased home consumption of dairy produce occasioned by the abnormal conditions in regard to foodstuffs obtaining during the war period. Owing to the large reduction in the imports of American bacon (the principal source of cheap fat) and of winter butter into Ireland, which is practically a summer dairying country, farmers have found it cheaper to use more home produce than to buy bacon and other foods at a high price. It has, moreover, been represented to us that in many cases milk producers ceased to supply milk to creameries, manufactured butter at home, and disposed of it at prices in excess of those which the creameries were in a position to pay. It is in view of this fact, but more especially having regard to the practical impossibility of arriving at even an approximate estimate of the increase in home consumption, that we do not consider it practicable to attempt to offer an estimate of the decline in production which could be regarded as reasonably accurate.

We have, however, received no evidence which would show that there is a general shortage of milk for human consumption, and any difficulties experienced in obtaining an adequate supply in certain cities and towns throughout the country must be regarded as due to the lack of a satisfactory system of distribution.

SECTION II.

CAUSES ASSIGNED FOR THE DECLINE, AND SUGGESTIONS FOR ENCOURAGING IMPROVEMENT IN THE INDUSTRY.

The causes to which the falling off in milk production may be attributed have been of varying effect in different districts, and we do not accordingly propose to endeavour to place them in any relative order of importance. It will, we think, suffice to examine the principal factors which have contributed throughout the country as a whole to lessen the output of dairy produce.

(a) LABOUR ON DAIRY FARMS.

Evidence as to the increasing difficulty of procuring sufficient and reliable skilled labour on Irish dairy farms has been general. Milking is probably the least popular of all branches of work on the farm, involving as it does long hours, no weekly holiday, and, above all, a seven-day working week. To obtain the maximum yield of milk, cows must be milked as nearly as possible at twelve-hour intervals, and their regular milking will permit of no break and of no dislocation. The milker must be a person possessed of a high degree of skill and of gentleness, as the milch cow is an animal which responds in an especial degree to sympathetic treatment. If both the qualities referred to are lacking in the milker there is danger of injury to the milking capacity of the cow.

While some improvement in the conditions under which work on the average dairy farm is at present carried out may be effected by economical re-arrangement of the homestead with a view to saving labour, such work must always be arduous in nature, and, accordingly, if the best and most careful class of workers is to be secured, they must be recompensed at a rate commensurate with the heavy and responsible work they are required to perform. In short, persons engaged in milking belong to a special category which requires special treatment in the matter of wages. On this class of worker depends not only the well-being of the milch cow but also the supply of the one article of food which is really indispensable. While we recognise that the difficulty of obtaining men or women who will be willing to work on seven days of the week is not always a question of the rate of wages obtaining for Sunday work, we cannot but feel that the difficulty is one which could, in many cases, be overcome by increased remuneration. We are satisfied from the evidence submitted to us by many successful farmers that dairy farming, carried out on sound economic lines, will permit of the payment of good wages, and the majority of such farmers have informed us that they have had no labour trouble whatever. We fear that in many districts there has been a tendency for the minimum wage fixed by the Agricultural Wages Board to become, in effect, the maximum wage, and where this is the case there appears to us to be little inducement, where work such as the milking of cows is involved, for the labourer to take that interest in his employer's business which is essential to its success. The fact that the employer and the labourer have an identity of interest is too frequently lost sight of. The whole question of the seven-day week is one of exceeding difficulty, and we can only suggest that if an inducement, possibly by way of bonus, in addition to the ordinary wage for Sunday work, were held out for regular attendance, complaints as to the failure of milkers to put in an appearance on Sundays would, in all probability, be much less frequent.

There is, however, a further aspect of the labour problem to which great prominence has been given in the evidence we have received. We refer to the question of strikes. There is no doubt that the fear of strikes is, to a rapidly increasing extent, inducing the larger dairy farmers either to turn to other branches of farming which are at present as remunerative as dairying and much less troublesome, or to reduce their dairy cattle to such numbers as could be looked after in an emergency by their own families. We have found this fear of strikes general throughout the dairying districts of the South, in which large dairy herds have hitherto been chiefly maintained. The following evidence from County Limerick is illustrative of the difficulties which have arisen in this connection:—

"It is, first of all, the seven-day-week work, with twelve to fourteen hours a day. They could probably get over that, but there is a new introduction which is the cause of all the trouble—that is the extension of the 'sympathetic' and the 'lightning' strike. These are the two worst features we have to deal with in the district—not the question of the amount of wages. The cost of living is striking the labourer pretty hard, too, and the farmer does not grumble so much at the wages. . . . The best dairying district in all Ireland is the West of this county (Limerick). The system there in dealing with the servant boys and girls is as follows:—At the beginning of March these men and girls are hired and paid anything from £30 to £45 for a period of twelve months, and boarded and lodged on the farm. That is the usual agreement here Coming to the 1st of August this year (1919) farm hands in the Newcastle West district struck work for a bonus of £4 harvest money. I am not saying that they were not entitled to strike, but the result was that in the event of the farmer refusing the bonus, his servants went out in the morning and there was nobody to milk the cows. Cows must be milked twice a day. Supposing his own family milked, what happened? A number of men attended the creamery and threatened the manager that if he took this farmer's milk they would call out the creamery staff. If the creamery refused his milk they might leave themselves open to an action, as some of them have an agreement that they cannot refuse a supplier's milk without sufficient cause."

Q.—"Do these conditions obtain in many cases?"

A.—"I don't know whether the people would like their names published. It occurred in five places. The farmers there say that they were caught once, and, perhaps, a second time, but they would not be caught a third time. Take the case of a farmer with no trouble at all with his servants. If I have trouble with my servants, and I am only one out of a hundred and fifty suppliers to a creamery which is bound to take my milk, the staff comes out, and the other hundred and forty-nine farmers must keep their milk. That is the difficulty here."

Similar situations have arisen in other districts, and the prospect of the staff of a creamery with a large number of suppliers being called out as a protest against receiving milk from a single supplier who has had disputes with his workers is a danger which many dairy farmers are reluctant to face.

It is to be feared that in many cases the organisers of agricultural labour are men with an insufficient knowledge of the difficulties peculiar to dairy farming, and that they frequently do not understand the damage caused by leaving cows unmilked. It cannot be too strongly emphasised that the care of milch cows will not permit of any cessation of work, and we are of opinion that a strike on a dairy farm can only be justified when every effort made to reach agreement has failed.

The problem of labour on dairy farms is, in this country, of the most pressing importance, as there is every reason to fear that unless a satisfactory solution is found to the difficulties which have arisen, and which we have outlined above, the number of large dairy herds in the country will be seriously reduced in the near future. The dairying industry will be stabilised and progress made only when on the one hand the labourer is satisfied with the conditions under which he has to work, and on the other the farmer has obtained security that contracts with employees will not be broken without sufficient warning and sufficient cause. We have given our most earnest consideration to this aspect of the industry, and are of opinion that the whole question of labour in relation to dairying is one which should be dealt with at a round-table conference representing the different organisations of farmers and of labourers. We have no doubt that a satisfactory settlement could be arrived at in regard to the different points at issue, and particularly those relating to Sunday work and to the provision which might be made with a view to the enforcement of agreements.

In view of the urgency of the matter, we adopted at a meeting held on the 4th February last a resolution requesting the Department to take immediate steps to arrange for a conference of this nature. We understand that a resolution on similar lines had already been adopted by the National Association of Insurance Committees (Ireland).

With regard to the question of arbitration in case of disputes, it appears to us that the recently created District Wages Committees, consisting as they do of equal numbers of employers' and labourers' representatives, with a neutral Chairman, are excellently adapted for the purpose, and we recommend that they should be empowered to act accordingly.

The Saving of Labour on the Dairy Farm.—We are satisfied that there is ample room on the majority of Irish dairy farms for improvement in the arrangement of the homestead with a view to securing the elimination of unnecessary labour in regard to such work as the handling of foodstuffs and the clearing of manure. The actual physical work could be materially reduced, for instance, if the "feed" were stored adjacent to the byre, and if manure had not to be carted a long distance to be disposed of. On small farms in particular, much could be done at little expense to reduce the laborious nature of dairy work and to render it more acceptable to the labourer. Owners of large holdings could afford with advantage to instal labour-saving devices, appliances for preparing food, etc. Elaborate byres are unnecessary and in the construction of new cow-houses simplicity should be aimed at, so that dirt could be easily seen and readily removed.

The water supply is of especial importance. At most farms water is supplied from a well, which may, in some cases, be in the farmyard, and in others a considerable distance away. From the point of view of the production of clean milk it is essential that water in adequate supply should be readily available. If water is at an inconvenient distance, such as is obtained is liable to be used over and over again for the washing of utensils, with the result that the cleanliness of the milk is adversely affected. We are of opinion that it would be to the interests of all creameries, both co-operative and proprietary, to consider the provision of facilities which would enable their suppliers to sink wells, which might be either of the open or the artesian type, according to the nature of the soil. Once a well has been provided, a tank could be readily constructed from which water could be run to the byre, the dairy, and for household purposes. This would ensure a supply not only for the cleansing of utensils, but also for the cooling of the milk. We do not think that the importance of this matter has yet been fully realised by creameries. An ordinary creamery could obtain two or three outfits, employ a few well sinkers, and, taking the suppliers in turn, could undertake to sink wells where necessary on their farms, so that water would be readily available. The labour saved to the farmer by the adoption of a scheme of this sort would, in the case of most dairy farms, be very great, and would soon repay the outlay.

Milking Machines.—The evidence which we have been able to obtain as to the working of mechanical milkers has been insufficient to enable us to arrive at any definite conclusions as to their efficiency from the point of view of saving labour. Moreover, opinions as to their merits are very varied. We recommend that a series of comprehensive tests should be carried out by the Department with machines of different types so as to render available for the dairy farmer expert advice as to the desirability of their installation.

(b) THE DISPARITY IN THE PRICES OBTAINING DURING THE WAR PERIOD FOR BEEF AND FOR DAIRY PRODUCE.

There has been an undoubted tendency during the past few years on the part of many farmers hitherto wholly or partially engaged in dairying to abandon the production of milk in favour of the raising of dry stock. Not only has beef production during the war been exceedingly lucrative, but it has also offered to the farmer a ready solution of the important problem of labour. The evidence furnished in this connection by a County Fermanagh farmer is indicative of the growing disposition amongst dairy farmers to turn to the store cattle trade :—

> "Up to the beginning of this year (1919) I kept about 15 or 16 dairy cows, but found that they had not paid during 1917 and 1918 in comparison with store cattle. The average yield was about 400 gallons—a high average for the district. The average price of the milk at the four local creameries in the two years 1917-1918 was about 9·15d. per gallon. Thus on the foregoing yield of 400 gallons the total income from a herd of 15 cows amounted to £228 15s. 0d. On the other hand, the same land carried 22 store cattle. The profit on the sale of these as 1½ year olds, after a year's feeding, was £14 each, or a total of £308, showing a balance in favour of the store cattle of about £80. The store cattle were bought in the months of March, April, and May, and were sold again about the same time in the following year. The cost of winter feeding was about the same for both the milch cows and the store cattle. As a set-off against the £80 extra from the store cattle, there was the value of the skim milk returned, which I estimated at a maximum of £4. This would just pay for the labour involved, and still left a big margin in favour of the store cattle. There was, in addition, the advantage of having no trouble in regard to labour."

The large increase, amounting to nearly 70,000, in the exports of fat cows for the year ended 31st May, 1919, as compared with the previous twelve months, must be attributed largely to the increasing tendency to dispose of cows at an earlier age than formerly. The high price obtaining for beef would appear to have resulted in the fattening off of cows which have produced only a few calves. There is evidence to show that ten or twelve years ago cows were generally retained with calf after calf until they were six or seven years old, but that at present there may be seen passing through Irish ports as fat cattle cows of excellent quality, young animals which have in all probability produced only one or at the utmost two calves.

The Relatively Low Price of Butter.—We have had evidence in every creamery district visited as to the falling off in the manufacture of butter owing to the fact that the prices obtainable, particularly in the early stages of control, did not yield a return comparable with that derived from other farm produce.

So far as dairy produce is concerned, the following table illustrates, in columns (b) and (c), the prices which should be paid for butter and cheese respectively in order to yield a return equal to that from whole milk for human consumption, taking the value of the milk at the prices stated in column (a) * :—

(a). Price of Whole Milk, f.o.r., per gal.		(b). Butter, per cwt. f.o.r.		(c). Cheese (hard) per cwt. f.o.r.	
s.	*d.*	*s.*	*d.*	*s.*	*d.*
1	0	250	0	119	0
1	1	273	0	128	6
1	2	296	0	138	0
1	3	318	0	148	0
1	4	341	0	157	0
1	5	364	0	167	0
1	6	387	0	176	0
1	7	411	0	185	6
1	8	434	0	195	0

* *Assumptions* :—

That one lb. of butter requires 2·457 gallons of milk.
That one gallon of milk will yield ·976 lb. of hard cheese.
That separated milk is worth 3d. per gallon for the feeding of stock.
That 80 per cent. separated milk is returned to the farmer.
That whey is worth 1½d. per gallon for the feeding of stock.
That ·80 per cent. whey is returned to the farmer
That cost of manufacturing and packing butter is 30s. per cwt.
That cost of manufacturing and packing cheese is 16s. per cwt.

The price of first-grade Irish butter for the British market has never exceeded 290s. per cwt., and for the home market, 331s. 4d. per cwt., while the price of hard cheese has reached 242s. 8d. per cwt., and the price of whole milk for direct human consumption has, of course, exceeded the prices stated above.

The encouragement given to the manufacture of cheese during the period of the war on account of its food value as a substitute for meat has undoubtedly contributed to a considerable extent to preventing the decline in the dairying industry from becoming much more marked, but the general disparity in prices as indicated in the foregoing table has reacted very unfavourably on the manufacture of butter. The effects of this reaction must be seriously considered, as butter-making is a key industry, the rearing of store cattle and pigs depending largely on its bye-products, and here we consider it right to remind the public of a fact realised by some, but by no means all, that it is upon this country that Great Britain depends entirely for its supply of store cattle. The importation of such cattle from overseas is still prohibited and prohibition is likely to continue. Ireland cannot possibly maintain its supplies of store cattle unless butter-making, on which these supplies largely depend, is maintained on a paying basis. It may be added that the manufacture of butter has also a very important bearing on the development of the poultry industry.

In our opinion, the logical result of a continuation of the policy of fixing a price for butter which renders it less remunerative than other farm produce will be that so far as this country is concerned both the store cattle trade and the pig-breeding industry will be very adversely affected, and we recommend that in any steps which may in future be taken to regulate the price of foodstuffs, the prices of dairy produce should be placed on a parity and should be comparable with those of beef and of other farm produce, so that neither would the manufacture of butter be discouraged, nor dairy farmers be obliged in their own interests to abandon dairy farming in favour of some other system which would either leave them greater profit or involve less risk and labour.

(c) DECLINE IN THE MILKING QUALITIES OF IRISH COWS.

The majority of the witnesses examined have been of opinion that the milking capacity of Irish cows is declining, the deterioration being generally attributed to the fact that the bulls selected for premiums under the Department's Scheme for the Improvement of Cattle have been mainly of a beef-producing type. We have disregarded in this connection all evidence other than that based on actual facts elicited by cow-testing, unless witnesses were in a position to offer irrefutable evidence that the alleged decline had been demonstrated to their satisfaction. It has not been possible to obtain generally figures as to milk yields in support of the opinion, and some records have been submitted showing that it is still possible to purchase in the open market cows equal in milking quality to those obtainable so long ago as 1891. Notwithstanding this, however, there is evidence to show that such cows have latterly become more scarce. No evidence has been produced from any quarter to show that the milking qualities of the cows of the country as a whole have improved. In view of the fact that the number of cows under test in Ireland is estimated at less than 1 per cent., it may reasonably be assumed that any improvement effected either through existing cow-testing schemes or the Department's Dairy Cattle Scheme has so far been insufficient to affect the general average.

We feel that we cannot but concur in the consensus of opinion that the bulls generally selected for premium purposes, while undoubtedly improving the beef producing qualities of Irish cattle, have achieved this object at the expense of their milk yields.

The Improvement of Dairy Stock.—Success or failure in dairying must largely depend upon the quality of the stock kept for breeding purposes, and we are satisfied that there is in this country excellent material for breeding high-class dairy cows, provided sufficient care and attention be devoted to its development. Having regard to the fact that at least 90 per cent. of Irish cattle are of the Shorthorn type, we consider that improvement can better and more rapidly be effected by concentrating on the grading up of this breed, which is thoroughly acclimatised and admirably adapted to the requirements of the country as a whole, than by the introduction of any other breed.

A number of the witnesses whom we examined expressed the opinion that from the point of view of improving the milk yield of our cows the introduction of Friesian cattle and the selection of bulls of this breed for premiums under the Department's Scheme would be desirable. Recognising, as we do, that records are available showing exceedingly high milk yields from a large number of Friesian cows, we have considered the question of their introduction very carefully, and, having regard to the following considerations, do not feel that any amendment to the Department's Cattle Breeding Scheme with a view to the inclusion of Friesian bulls for premium purposes can be recommended :—

(1) While records are available showing that many British-Friesian cows are heavy milkers, there does not appear to be any evidence that the milk yield of the average herd is exceptional.

(2) Generally speaking, the milk of British-Friesian cows would appear to have a low percentage of butter-fat. This was demonstrated at the Royal Show at Cardiff in June, 1919, when of ten cows entered in the class for this breed only one cow reached the standard required to qualify for a prize. In a similar class at the Dairy Show held in London in October, 1919, only one cow from amongst five entered reached the necessary standard. It may be taken for granted that some of the best specimens of the breed were exhibited at these Shows.

If butter-making is to continue as the main object of Irish dairy farmers, the percentage of butter-fat is a very important factor.

(3) The beef and store cattle trade of this country is a very valuable asset, and, so far as we have been able to ascertain, Friesian cattle are not so good a general

purpose breed as the Shorthorn. It appears to us very doubtful whether the crossing of the two breeds would produce a type which would be acceptable either to farmers or to dealers.

We do not wish to exclude from consideration by the Department the desirability of encouraging the establishment of pure-bred herds of cattle of a milking strain, such as Friesians or Ayrshires, where a plentiful supply of milk is the main consideration. But we do not consider that, taken as a whole, either the dairying industry or the farming industry generally would be permanently benefited by the crossing of our deep-milking Shorthorns—whether pure-bred or half-bred—with a strain of cattle which might produce good milkers, but inferior stores.

In considering any scheme for improving the dairy stock of the country, the importance of the store cattle trade cannot be overlooked; the value of the store cattle exported in 1918 amounted to nearly £8,000,000. It is upon the dairying districts that the store-raising areas depend for their young stock. To maintain this important industry it is essential that there should be cows which will return a reasonable profit as dairy animals, and will also produce calves which can readily be converted into beef. We are of opinion that the ideal cow for the country would be one giving an annual yield of from 700 to 800 gallons of good quality milk, be a regular breeder, and produce good store stock, and we consider that efforts in the direction of the improvement of our dairy cattle should aim at the production of an animal of this type. We are aware that there are in the country many Shorthorn cows giving an average annual yield of over 1,000 gallons, but the expert evidence we have heard would show that an abnormal yield of milk is likely to be produced at the expense of the animal's constitution.

The improvement of dairy cattle can be effected only by testing and selecting the best milkers, and mating them with bulls of their own type, showing several crosses of a milking ancestry on both the male and female sides. It is of importance to emphasise the fact that a pure-bred animal is more likely to perpetuate milking qualities than a cross-bred. The present inadequate supply of pure-bred dairy bulls is the chief obstacle to the development of the dairy stock of the country. The number of bulls standing for service under the Department's Scheme in 1919 was 651, of which only 79 were pure-bred animals with milking pedigrees. We have been glad to learn, however, that there appears to be amongst farmers a growing appreciation of the merits of dairy bulls, and that the demand for them is rapidly increasing, and we consider it accordingly of the utmost importance that the Department should take all possible steps to arrange for a satisfactory supply. This may be done in the following ways:—

(1) By the encouragement of the production of pure-bred dairy cattle by private breeders, by (*a*) supplying them with high-class stock bulls of milking strain at a nominal sum for hire; (*b*) extending the Department's Loan Scheme so as to afford reasonable credit facilities to small breeders who desire to purchase pure-bred high-class dairy stock (both bulls and cows); (*c*) by increasing to £30 the premium for bulls with milk records on both the male and female sides of their ancestry. In this connection we recommend also that the Department's Cattle Breeding Scheme should be amended so as to permit of such bulls standing for service under the Scheme for a longer period than five years, provided there is evidence that their service condition is sound. Under the Scheme as it at present stands, dairy bulls are disposed of before the milk yields of their first-calf heifers are available, and before anything is known as to their value as producers of good stock.

(2) By the establishment by the Department at their own farms of herds of pure-bred dairy Shorthorn cattle. These herds would be centres from which both bulls and surplus females would be available for distribution.

In view of the great importance of the dairying industry, we consider it absolutely essential that the Department should take a large part in the breeding of pure-bred dairy stock, to be used for raising the general standard of the dairy cattle of the country.

Prizes for Dairy Cattle.—We recommend that the Department should give grants to the principal agricultural societies to enable them to provide substantial prizes for pure-bred dairy Shorthorn cattle, both male and female.

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In adjudicating in classes for such cattle, the milk records of the animals, or of their ancestors, should be given relatively more importance than shape or appearance.

The Disposal of Dairy Bulls at Shows and Sales.—It has been represented to us that under the existing arrangements at the various Shows and Sales at which bulls are approved for premium purposes, the animals are sold in the order in which they are catalogued, with the frequent result that applicants selected under county live-stock schemes to hold pure-bred dairy bulls have preferred to purchase animals not of milking strain, in the fear that dairy bulls which might be sold later would reach prices beyond their means, and that they would accordingly be forced to go without a bull. We would suggest that the Department should approach the societies and firms responsible for these sales, with a view to arranging that in all cases dairy bulls should be put up for auction before other animals, so that persons desiring to obtain one of these bulls would be afforded an opportunity of bidding, with the practical certainty, if unsuccessful, of being able to acquire in the last resort one of the ordinary type.

The Licensing of Bulls.—We have received a great deal of evidence as to the general use throughout the country of "scrub" bulls, and as to their very injurious effect on the milking as well as the beef-producing qualities of Irish cattle. It is obvious that the use of such bulls must nullify to a considerable extent any schemes for the improvement of cattle which may be in operation, and we consider that their use should be prohibited. We recommend, accordingly, that only those bulls which conform to a definite standard of quality should be approved for service, and that the Department should take steps to obtain the necessary powers in this connection, and to put into force as soon as practicable a measure for the licensing of bulls.

Kerry Cattle.—While of opinion that the milking strain of Shorthorn is the type most suited from a dairying point of view to the country as a whole, we think it is to be regretted that there is not a more general appreciation of the merits of the Kerry breed, and of their exceptional suitability for mountainous districts. Kerry cattle will thrive well where a larger breed could not be kept, and in the poorer districts every encouragement should be given to their breeding. We have also had evidence to show that the Shorthorn-Kerry cross is a satisfactory beef animal.

The following particulars of yields of milch cows entered on the Kerry Cattle Register have been furnished to us as giving an indication of the milking qualities of the breed; in all, eleven herds, with a total of 92 cows, were under test:—

12 cows gave over 700 gallons.
23 cows gave between 600 gallons and 700 gallons.
43 cows gave between 500 gallons and 600 gallons.
14 cows gave between 450 gallons and 500 gallons.

The majority of these fourteen were heifers in their first period of lactation.

The highest yield was 855 gallons of milk.

As compared with other breeds, the butter-fat percentages were remarkably high. Eight cows gave over 5 per cent. butter-fat; sixty-two cows yielded milk containing between 4 per cent. and 5 per cent. butter-fat; and of the ninety-two cows whose records are published only two gave under 3·5 per cent. butter-fat.

No breed other than the Kerry is kept by small holders throughout the whole of the mountainous districts of County Kerry and in the Berehaven district of County Cork, and the breed is general amongst cottiers in Counties Limerick, Cork, and Tipperary. We recognise, however, that much as the keeping of these cattle would appear desirable in many districts of the West, where milk is scarce, the demand in these districts is rather for beef-producing animals of the Galloway type, and in the circumstances any effort to introduce Kerry cattle would meet with little or no support, unless and until their undoubted qualities as milk producers are better known and appreciated.

The Keeping of Milk Records.—It is estimated that the average milk yield of Irish cows is at present little over 400 gallons annually, and as we have received evidence to show that there are many cows giving an annual yield of from 600 to 1,200 gallons, it is clear that a large number must give yields of less than 400 gallons each. A cow giving such a low yield can hardly be kept by a dairy farmer, except at a loss. As one witness stated, "there are far too many cases of the farmer keeping the cows instead of the cows keeping the farmer!" We are satisfied, however, that many farmers do not know which of their cows are, from the milk-producing point of view, the good ones and which the bad, and the only way in which they can learn with certainty which of their cows are profitable is by the systematic keeping of records of their yields.

Having regard to the milch cow population of the country, and taking milk at the comparatively low price of 10*d.* a gallon, an increase in the average milk yield per cow of 200 gallons, which all expert witnesses have agreed would be attainable with the general adoption of cow-testing, coupled with breeding from suitable bulls, would represent an additional annual sum of approximately £12,000,000 to the wealth of the country, and would, moreover, be the most certain method of reducing the cost of milk. In herds in Canada in which records have been systematically kept, the average annual milk yield per cow has been increased by 245 gallons, and in Sweden the yield has been increased by 200 gallons. The possibility of improvement in this country is even more promising, in view of the fact that both its climate and soil render it particularly adaptable for dairying. The practice of keeping milk records must, accordingly, be regarded as a work of national importance, and as experience has shown that in the formation of cow-testing associations, which form the best means of developing the system, local organised effort is not always forthcoming, the provision of ample State assistance with a view to its extension is both justifiable and desirable.

While we do not think it necessary to advert at length to the value of cow-testing, we think the following table, which shows the difference between the average yields, &c., in 1918 of the ten best and of the ten worst cows in each of six cow-testing associations in various parts of the country, worthy of record :—

No.	Cows.	Average number of days in milk.	Average quantity of milk produced.	Average butter-fat test	Average yield of butter fat.	*Average value of milk per cow.	Average difference in favour of *each* of the ten best cows.
		Days.	lb.	%	lb.	£ *s.* *d.*	£ *s.* *d.*
1	Best ten ...	306	8,744	4·24	396·00	45 5 0	31 19 4
	Worst ten ...	189	2,769	4·16	115·00	13 5 8	
2	Best ten ...	286	8,455	3·88	329·43	38 8 0	30 13 4
	Worst ten ...	137	2,026	3·13	64·30	7 14 8	
3	Best ten ...	273	8,557	3·60	320·11	37 10 8	29 0 8
	Worst ten ...	161	2,100	3·40	71·49	8 10 0	
4	Best ten ...	280	8,796	3·70	321·90	37 17 2	27 2 4
	Worst ten ...	196	2,566	3·50	90·83	10 14 10	
5	Best ten ...	291	8,289	3·67	307·68	36 2 4	24 5 4
	Worst ten ...	203	2,868	3·40	100·02	11 17 0	
6	Best ten ...	294	8,053	3·68	297·32	34 18 8	22 4 6
	Worst ten ...	203	3,179	3·30	106·58	12 14 2	

* The value of milk is calculated at 2s. per lb. of butter-fat and 2d. per gallon of separated milk (80 per cent. of whole milk). These prices are very much below the present values, but serve for the purpose of comparison.

An examination of the circumstances which would appear to have hindered the more general adoption of the keeping of milk records by farmers in Ireland would seem desirable. It appears to us that the propaganda work which has hitherto been carried out by the Department has not been sufficient to bring home to farmers the advantages to be derived from cow-testing, and that the majority have not yet realised its great possibilities. In this connection we welcome the energetic and practical steps which the Department are now taking to bring its importance before them. It is difficult to convince most farmers that good milking cattle cannot be judged by appearance, and that the yield of a cow cannot be ascertained without testing for a full lactation period. Generally speaking, they appear content so long as they are satisfied that their herds as a whole are paying. Instances in which the work has been taken up and subsequently discontinued would seem to be due in some measure to the fact that the benefits are not immediate, and that owing to the difficulty of replacing bad cows by good ones it may be necessary to wait for four or five years for results; but we fear that the chief reason in most cases has been, as many farmers examined admitted, that the work of weighing and sampling the milk was regarded as "too much trouble." Such farmers have, however, invariably also admitted that their action has been short-sighted. We have been glad to learn that in a number of districts where cow-testing associations have fallen through, there are farmers who still continue the practice of milk recording for the information it affords, and also that a number of these associations have been revived, while a considerable number of new ones are being formed.

It has been stated in evidence that some farmers have objected to joining cow-testing associations on account of the small contribution (one shilling) required in respect of each cow. We believe that such cases are very exceptional, and have, in fact, been informed that in some associations members are now paying as much as six shillings per cow. We consider some payment by members of associations to be essential, as experience shows that they will undoubtedly take a greater interest in work towards the cost of which they have themselves contributed.

The following is a brief outline of the two classes of cow-testing associations at present recognised under the Department's Scheme :—

Class A, in which it is required that milk records shall be kept in respect of at least 100 cows throughout the entire milking period, each member undertaking to weigh and take samples of the milk of each of his cows on every seventh day, the weights being duly recorded, and the samples submitted for testing.

Class B, in which each association must have a minimum of 200 cows on test, the members as in the case of the Class A association weighing and recording the milk yields on every seventh day. In this class of association the services of a whole-time supervisor are available. This officer visits each member's herd at least once a month, checking the weighings and sampling the milk of the cows.

There appears to be no doubt that, provided funds are available for their development, associations of the Class B type are more likely to be widely adopted than those of the nature of Class A. The independent check on the yields and quality of the milk exercised by the supervisor are generally regarded as adding to the reliability of the farmer's records, and accordingly as being of special value in cases where bull calves are available for disposal.

From the evidence received it would appear that the difficulty in establishing cow-testing associations in districts where the farms are small, and the number of cows kept by individual farmers rarely averages more than three or four, has been in large measure due to the fact that it is almost impossible to get together the minimum number of cows required before an association will be recognised for a grant. We think that in this respect the Department's Scheme is not sufficiently elastic, and suggest that the Department should consider the advisability of amending it so as to admit in special circumstances of the recognition, in so far at least as Class A associations are concerned, of those in which less than the minimum number of cows at present prescribed has been secured.

As already stated, however, from the point of view of the extension of cow-testing, we consider that associations of the Class B type are to be preferred, and we recommend that the efforts of the Department should be mainly directed towards the establishment of associations of this class. Successful development must depend largely upon the possibility of obtaining suitable supervisors, and it is in this respect that difficulty at present exists. A supervisor must be a man of character, in whom members will have absolute confidence, and who can be relied upon not to be influenced in the carrying out of his duties by interested persons. If enthusiastic and energetic supervisors are available, the growth of cow-testing associations will, in our judgment, be assured. The question is almost entirely one of finance, as if the right type of men are to be secured they must be adequately remunerated. In an association with 200 cows, the supervisor's salary at present would be about £30 per annum, the members contributing at the rate of one shilling, and the Department at the rate of two shillings per cow. In cases where the members are willing to contribute two shillings we understand that the Department will increase their grant to three shillings per cow. This rate of pay appears to us to be hopelessly inadequate, having regard to the great importance of the work, and we strongly recommend that the Department should be provided with funds sufficient to enable them to adjust their grants on a basis which will ensure that no supervisor shall receive a salary of less than £150 per annum. It is essential that supervisors should be paid at a rate which will attract a good type of man.

Cow-testing Associations in relation to Creameries.—In the early d
testing in Ireland, an association was usually formed in connection with
the manager of which acted as secretary and tester. For various re
ever, creameries gradually gave up the work. For example, once an
had got into working order there arose the necessity for constant super
member's work, with insistence on the need for accurate and regular w
sampling of the milk of each cow, and for the general education of ev
from the results of the testing carried out in his own herd, not only
breeding, but also in regard to economical feeding and general manag
creamery manager could not, as a rule, afford the necessary time for thes
duties, and in any event his remuneration—two pence for each test—wa
insufficient to encourage him to continue the work.

We are, nevertheless, of opinion that cow-testing can the more ra
tended if the co-operation of the creameries can again be secured, unde
satisfactory to them and their managers. We understand that the
have under consideration the amendment of their existing scheme with
in view. A creamery, whether proprietary or co-operative, is, to all
purposes, an association of cow-keepers, and the creamery manager
touch with the individual milk producer, being accordingly in a positio
to him the advantages of testing his cows in a manner which is more
effective than education by means of leaflets or the Press. There is
already available at the creamery all the apparatus necessary for the
of the work. The creamery itself stands to benefit considerably, as
local supply of milk means a larger turnover, with a corresponding decreas
expenses.

Necessity for Dairy Bulls in conjunction with Associations.—If cow-testing associations are to attain their maximum value it is essential that there should be available for the use of the members pure-bred bulls of milking strain. If these are not forthcoming there is every probability that the work of grading up the cattle will be seriously handicapped. This may be illustrated by the following extract from the evidence of a Tipperary farmer:—

> "I have been a member of a cow-testing association since 1908. I bought three premium Shorthorn bulls, of which only one could be considered reasonably satisfactory They were not of a milking strain. With the exception of one of these bulls, which was a good dual-purpose animal, their progeny reduced the quality of my herd after eleven years' cow-testing, although I bred only from my best cows.".

We recommend that the Department should provide special credit or other facilities to associations to enable them to acquire bulls of milking type, and would suggest that where associations are working in connection with creameries it would be to the advantage of the latter to contribute towards the cost of suitable sires. Some, indeed, have already done so.

The Compulsory Keeping of Milk Records.—Very many witnesses have expressed the view that the keeping of milk records should be compulsory. We do not, however, consider that any efforts at compulsion in this direction are desirable, and, moreover, do not think that any satisfactory method of administering an Order issued in this connection could be devised. We prefer that education and propaganda should be relied upon to bring about the desired result.

Necessity for Increased State Aid for the Improvement of Dairy Stock.—We are of opinion that the funds available for the Department's Dairy Cattle Schemes are altogether inadequate, and strongly recommend that the allocations under this head should be very considerably increased, so as to permit of the development of the schemes on the lines we have indicated. Provision should also be made for the appointment of additional officers, as it would appear that the existing staff could not cope with any substantial increase or new development in the work.

Injudicious Disposal of Good Cows.—No suggestions as to possible methods of improving the dairy stock of the country would be complete without a reference to the regrettable practice, which is far too prevalent, of selling off the best cows on account of their present enhanced price. Such cows are generally shipped out of the country, or disposed of to town dairymen, by whom they are sold fat after a single milking period, while second and third-rate heifers are retained to form the basis of future herds. It is a sacrifice of a potential milk supply to fatten off a good cow which is still in her prime, and the practice cannot be too strongly condemned. Even where the farmers retain their best milkers there is a tendency to sell the foundation stock, and this is especially to be deprecated on account of the increasing difficulty of purchasing good cows. It is to be hoped that with the development of cow-testing the practice will rapidly disappear. We have, in fact, been informed that in districts where testing is at present carried out farmers are not now so ready to dispose of their good cows as they have been in the past.

Necessity for a Better Distribution of Dates of Calving.—Practical experience has amply demonstrated the fact that cows calving in the autumn will give a greater yield of milk than if they had calved in the spring, and that their calves are more easily reared, and develop into better animals than those born in the latter season. There is evidence to show that 70 per cent. of Irish calves are born in the months of March, April, and May, and this is a factor which is accountable to no small extent for the shortage of milk in the winter months, particularly in December and January. It is very desirable that, both in their own and the public interest, dairy farmers who produce milk for town supply should effect such re-arrangement of their herds as would ensure that a proportion of their cows would calve in the autumn or early winter months.

(d) THE SHORTAGE OF IMPORTED FEEDING STUFFS, AND OF FERTILISERS FOR PASTURES.

As a result of the abnormal conditions obtaining during the past few years, cake and other feeding stuffs have been both scarce and dear. The following table shows the quantities of the feeding stuffs most generally used in Ireland imported into the country for each year since 1913:—

YEAR.	Linseed Cake.	Cotton-seed Cake.	Oilcake (Unclassified).	Bran and Pollard.	Maize.	Total.
	(Tons).	*(Tons).*	*(Tons).*	*(Tons).*	*(Tons).*	*(Tons).*
1913 ...	27,930	20,538	18,967	58,174	744,009	869,618
1914 ...	27,166	15,796	20,125	67,334	656,407	786,828
1915 ...	25,183	17,504	20,053	67,209	685,955	815,904
1916 ...	22,046	17,501	17,454	54,392	509,816	621,209
1917 ...	18,143	7,666	12,490	45,265	371,182	454,746
1918 ...	12,824	2,192	5,788	2,124	107,747	130,675
1919 ...	26,701	8,005	12,890	17,651	231,963	297,210

The effects of this shortage have, we think, been somewhat exaggerated, but at the same time it has been an undoubted factor in the falling off in milk production during the period of the war, and its effects have, of course, been most marked in those districts where winter dairying is carried out, particularly where the farms are small, and the proportion of purchased foodstuffs relatively high.

We have occasionally found the impression existing that the position of Ireland during these years in regard to the supply of imported feeding stuffs has been unfavourable as contrasted with that of Great Britain. From the evidence submitted to us, however, we are satisfied that this is not and has not been the case. The Department, who have been represented on the administrative committees concerned with the distribution of these feeding stuffs in the United Kingdom, appear to have been most successful in securing for this country its fair proportion of the supplies available. The demand for all feeding stuffs has, of course, been checked by their high prices.

As to the present position regarding feeding stuffs, statistics show that during the three months August to October, 1919, the imports of cotton, linseed, and other cakes were on a level with the imports during the same period of 1913, and it may be taken that there is now in the country as much decorticated cotton cake as is required. The supply of linseed is still short, but palm nut cake is available in reasonable quantity. Maize, of which the supply has hitherto been exceptionally small, is now available in more ample quantity.

We think it well to add that farmers do not yet appear to recognise the value for feeding purposes of some of the more recently introduced foods, such as dried grains, dried yeast, palm nut cake, and cocoa-nut cake. These foodstuffs are relatively much cheaper and better than many of those commonly used, notwithstanding which considerable quantities of dried grains and dried yeast are being exported owing to insufficient home demand.

Necessity for Increased Home Production of Foodstuffs.—The only remedy for the decreased milk yields due to the scarcity of imported feeding stuffs lies in the increased home production of roots, grain crops, and forage crops. This would ensure a regular supply of food for cattle at all seasons, and help to prevent a falling off in milk yields during periods of scarcity, *i.e.*, in winter and in dry summers. Practically everything necessary to keep up a good milk supply can be grown on the farm, and where a proper system of tillage is carried out the quantity of cattle food to be purchased is small. There is no better food for dairy cattle than home-grown crushed oats, turnips and hay, and we regret to have received evidence to the effect that there has been a demand from some Irish dairying districts for an outlet for oats, and also that the ready market and remunerative prices prevailing for roots and grain have, in many cases, led to farmers disposing of even such supplies as were necessary to ensure that their cows would milk to their maximum capacity. It would appear from this that the fact that the good wintering of cattle means a substantial increase in their milk yields in the following season is not yet sufficiently widely appreciated, and requires to be brought home to many dairy farmers.

Ensilage.—The system of ensilage is one which we think might be more generally encouraged. Silage is a useful and economical food for cattle, being especially suitable for the winter feeding of milch cows. In districts where for any reason, such as scarcity of labour or the unsuitability of the land, root crops cannot be produced, the growing and conversion of such crops as vetches, oats, peas, &c., into silage is to be recommended. Where there is difficulty in making first-class hay, the grass, if converted into silage, will have a higher feeding value than badly-made hay, but silage of this nature is not so good as that made from fodder crops.

We recommend that a comprehensive series of experiments should be carried out by the Department with a view to ascertaining the relative merits and economic possibilities of silage as compared with other cattle foods.

Effect of the Tillage Orders.—It has been represented to us that the Tillage Orders have adversely affected the production of milk, owing partly to the fact that the breaking up of fresh land lessened the amount of labour available for looking after cows, and partly to the fact that a reduction in the number of cows occasionally became necessary on large farms where there had not previously been much tillage, owing to the difficulty of procuring feeding stuffs. We recognise that the smaller farmer has generally had a certain amount of home-grown cattle food available, and that where there was little but grass to fall back upon the breaking up of a certain amount of pasture may, in some cases, have resulted in the disposal of cattle. Experience, however, would show that in such cases in the following season the stock-carrying capacity of the farms should be substantially increased. In this connection, it is worthy of note that the total number of cattle in the country on 1st June, 1919, was 5,029,450, the highest figure yet recorded, except that for 1914, when, owing to restrictions on export in consequence of foot-and-mouth disease, the cattle population was abnormally large.

Deterioration of Pastures owing to Lack of Basic Slag.—We have received a great deal of evidence as to the effects of the shortage of basic slag on pasture land throughout the country. Slag is the fertiliser most generally used in Ireland for this class of land.

As in the case of feeding stuffs, every effort appears to have been made by the Department to obtain for the country its fair proportion of the supplies of slag and other fertilisers available. Officers were stationed in London, Liverpool, Middlesborough (the centre from which, in previous years, the largest supplies of basic slag were obtained) and Wales. The following figures as to the imports of slag during each year since 1913 show that the efforts made in this connection must be regarded as having borne as satisfactory results as have been in all the circumstances possible, and that during these years supplies were up to pre-war level :—

	Tons.
1913	33,474
1914	37,868
1915	30,861
1916	29,767
1917	46,191
1918	58,493
1919	48,772

owever, to the increased demand by all classes of farmers for this ccount of the shortage of other manures, the quantity available for has considerably diminished, with the result that the capacity of such ying stock has been impaired. It is in the improvement of the stock-city of the land, rather than in its effect on the actual milk yields of at the manuring of pastures is of advantage.

he past year the position in regard to basic slag has not been so but at the same time it may be assumed that supplies in this country good as in any other part of the United Kingdom. Hitherto, most of rted has been of high grade, but alterations in the process of manufac- of which slag is a by-product, will necessitate farmers being prepared ccept slag of a lower grade. The new process enables manufacturers eel at a reduced cost, but at the same time the quality of the slag is armers will accordingly in future be obliged to use larger quantities ser than has hitherto been necessary to obtain the same results, and aking they will not receive the same value as heretofore.

The price of basic slag to Irish buyers has also increased during the past year. This has been due to the fact that in the endeavour to secure better supplies of high grade slag it was pointed out to manufacturers that the effect of the high transit charges to this country would be to increase the cost of low-grade slag, even although the initial price was less, up to seven shillings per unit of phosphates, whilst reducing the total cost, in the case of the high-grade commodity, down to four shillings per unit. Under the arrangements existing in 1918, slag was delivered f.o.b. at Irish ports. During the past year, however, it has been delivered free only at the English ports, and Irish buyers have had to pay for its transit across Channel. Together with the cost of handling at the ports in this country, this has meant an addition of roughly thirty-five to thirty-eight shillings per ton, all of which has, of course, increased the price of the slag to the farmer.

As regards superphosphate, which is also of especial value to dairy farmers, the position cannot be regarded as very satisfactory. Most of the supply of this fertiliser required to meet Irish needs is manufactured in the country; but is dependent on shipping facilities for the raw material from Florida and from North Africa. The tonnage available has unfortunately not been adequate, and supplies of this material have in consequence been short. As a result of representations made some months ago to the Controller of Shipping, a proportion of cargo space, which had previously been requisitioned for other purposes, was allotted for the carriage of rock phosphates, and more satisfactory supplies have since become available. The demand is still greatly in excess of the supply, but it is hoped that additional transport facilities will be forthcoming in the near future.

(e) EFFECT OF THE RESTRICTIONS ON THE EXPORT OF FEMALE CA

A good deal of prominence has been given in the evidence we hav
to the effect on the production of milch cattle of the Orders issued du
period regulating the export of springers and of milch cows.

The Order, which is still in force, prohibiting the export of springer
in 1914 with a view to safeguarding against a dearth of good calves
increasing export from the country of its best cows. As a result of t
its first issue, many farmers in dairying districts who had been accust
duce a certain proportion of in-calf heifers for shipment were obliged t
animals as they had on hand, a proceeding for which in most cases th
appear to have been prepared. Facilities for treating the cattle on ca
milking were frequently absent, and the prices obtainable in the h
were low in comparison with the prices of beef animals. As a result,
were fattened off and sold for slaughter, and it is to be feared that m
retained deteriorated in value on account of inadequate milking. (
absence of a market for superfluous animals at satisfactory prices,
herds would appear to have been reduced, and the stock from which heif
disposed of. The result of the Order would generally seem to ba
breeders to some extent gave up the practice of putting heifers to the b

Notwithstanding the restrictions imposed from time to time on
milch cows, the number of such cattle in the country has declined, while, as has been already pointed out, there has been a marked increase in the number of fat cows exported.

The restrictions on the slaughter of immature female cattle were undoubtedly desirable and necessary, but it is very doubtful whether the prohibition of the export of in-calf heifers has achieved the purpose for which it was intended. On the contrary, the effect of the Order appears to have been to discourage the retention of such animals throughout the country. It must be remembered that the owners of heifers had open to them a very remunerative market in the fat stock trade, and, as a result of the Order, many heifers which might have been kept for dairy purposes found their way to the abbatoir.

The balance of evidence goes to show that this Order has tended to discourage the breeding of dairy stock, and we recommend, accordingly, that it should be rescinded.

(f) CONTAGIOUS ABORTION.

In almost every district visited we have received evidence as to the very general prevalence of contagious abortion, and its effects in dairy herds. It appears to us that sufficient attention has not yet been given to investigation into the causes and treatment of this disease, and accordingly we recommend that the Department should take steps to institute in this connection a thorough system of research with a view to discovering means of combating the disease which will be more effective than those at present available. Interesting evidence has been furnished to us regarding inoculation experiments carried out since 1916 by Mr. J. F. Healy, M.R.C.V.S., of Midleton, County Cork, under arrangements made by the Governors of the Munster Dairy School and Technical Institute, and while these experiments would appear to have been on the right lines, they have been too limited in extent to provide a basis upon which reliable conclusions in regard to the disease might be founded.

From the evidence we have heard, stock raisers do not generally appear to be aware that the Department will supply, free of charge, vaccine for the preventive treatment of cows by qualified veterinary surgeons; neither does it appear that farmers have been made sufficiently aware that facilities are afforded for the treatment of animals suffering from the disease. More effective steps should be taken to make these facts more widely known.

We have given our serious consideration to the suggestion put forward by many witnesses that contagious abortion should be scheduled as a notifiable disease, and while we recognise that there are many difficulties in the way of enforcing an Order issued to this end, amongst them the general lack of knowledge regarding the disease, and the obscurity of its symptoms, we consider the present unrestricted movement of infected cattle very undesirable, and that such an Order would help considerably in the direction of combating the ravages of the disease. We recommend, accordingly, that notification of the suspected existence of contagious abortion should be compulsory. At the same time, every effort must be made to educate public opinion as to the necessity for stringent regulations in regard to the disease.

SECTION III.

MILK SUPPLY TO CITIES AND TOWNS.

Notwithstanding the general impression which appears to prevail that there is a shortage of milk for consumption in cities and urban areas throughout the country, we have been unable, as has already been indicated, to obtain any evidence which would show that any such shortage exists, and we consider, accordingly, that in those towns where there is a scarcity the absence of any properly organised system of distribution must be regarded as the prime cause. So far as the large centres of population are concerned, we have received evidence which would show that the supply is sufficient to meet requirements. For instance, both the Medical Superintendent Officer of Health and the Chairman of the Public Health Committee for Belfast have expressed the opinion that the city's supply of milk is adequate, while we are aware that in Dublin a large quantity of milk, primarily intended for human consumption, is being churned daily on account of insufficient demand. It must, accordingly, be concluded that the consumption of milk in such centres is at present regulated rather by its price than by an inadequacy of supply. We have, moreover, had evidence to show that the practice of purchasing condensed milk on the part of the poor is on the increase, notwithstanding a growing appreciation of the value of whole milk as a food.

There are at present two sources of supply to large towns, *i.e.*, the milk produced by town dairymen, and that received from rural producers, and a consideration of each of these sources is necessary.

Town Milk Production.—This system is, in our opinion, entirely uneconomic. The town dairyman owns no land, breeds no milch cattle, and produces no feeding stuffs. He must purchase in the open market, frequently at inflated prices, everything necessary for the carrying on of his business, and must compete with graziers and others for pasturage in the neighbourhood of the town, for which in recent years he has as a rule had to pay an excessive rent. The result is that to allow of an adequate return for milk produced under such conditions, the price charged must be altogether out of proportion to that at which milk produced by the dairy farmer could be retailed. The prevailing system of distribution tends still further to increase the price. It is common to see four or five different distributors delivering milk at as many adjacent houses. In the circumstances, the present high prices of milk in Dublin and Belfast can be regarded only as a subsidy to uneconomic production and distribution, and we have found that they have led to a tendency to increase prices throughout the country. In Omagh, for instance, up to 10d. a quart was charged for milk by local producers until a control price of 8d. was fixed. Moreover, the usual result of a system of control is that the maximum price fixed becomes in practice the minimum, and both in Dublin and Belfast milk brought by rail and purchased at a relatively low cost is widely retailed at the price fixed to meet the demands of the town producer. For example, we found that milk for which the rural producer received 1s. a gallon, delivered f. o. r. at Belfast, was sold during last summer at 2s. 4d., thus allowing to the retailer a margin of 1s. 4d. per gallon, which no system of distribution, however uneconomic, could justify.

Probably, however, the most serious effect of the town dairying system, from a national point of view, is that it results in the depletion of the best dairy stock of the country. The town dairyman pays a high price and purchases the best milch cows available. Owing to the absence of facilities for retaining animals not in milk, such cows are disposed of after a single period of lactation, the vast majority being sold fat and slaughtered for beef. We have had evidence from every part of the country as to the increasing difficulty of obtaining good cows largely as a result of this practice, and if for no other reason the system of town dairying must be condemned.

Milk Supplies from Rural Districts.—The following table shows the annual quantities of milk received by rail at Dublin, Belfast, and Cork for approximately the past two years :—

Twelve Months	Dublin.	Belfast.	Cork.	Total.
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*
Ended 4th January, 1919 ...	1,755,473	1,350,422	556,575	3,662,470
Ended 5th April, 1919 ...	1,809,417	1,448,666	545,293	3,803,376
Ended 5th July, 1919	1,847,520	1,515,743	525,209	3,888,472
Ended 6th September, 1919 ...	1,841,728	1,535,604	485,154	3,862,486
Ended 6th December, 1919 ...	1,770,859	1,487,444	458,258	3,716,261
Ended 3rd January, 1920 ...	1,742,862	1,479,520	448,802	3,671,184

It will be observed from these figures that a substantial amount of the milk consumed in these cities is produced in rural districts, and as such milk could undoubtedly be sold at a lower price than can that produced under town conditions, we are of opinion, in view of the urgent necessity for reducing the present prices so as to bring an adequate supply of milk within the reach of the poorest families, that every effort should be made to secure that the whole supply necessary for towns should be obtained from rural sources. We have had expert evidence to show that clean, cooled milk can be sent by rail from any part of this country to any other part, without pasteurisation, even in the hottest weather, in perfect condition for human consumption.

The Transit of Milk by Rail.—The most general complaint received from producers who send milk by rail has been with reference to the loss of cans. It has been suggested that with a view to obviating such losses the Railway Companies should charge for and waybill empty cans, thus undertaking responsibility for their satisfactory return to the senders. In this connection we have been informed by Mr. E. A. Neale, General Manager of the Great Southern and Western Railway, that a large milk purchasing firm had stated that a charge of even 2d. on each can would amount, in the year, to considerably more than the value of the cans lost, and that such an arrangement would not pay them. This has been borne out by other evidence received.

The chief causes of lost cans may be summarised as follows :—

(1). They are not always properly labelled, the labels being frequently of a kind (*i.e.*, scraps of paper or cardboard) which will not stand handling.

(2). The lids are often not firmly secured.

(3). Empty cans are, occasionally, sent to a station other than that of their owner, showing that the consignees sometimes used the cans for other persons' milk. Cans which, owing to this practice, get off their normal track are easily lost or stolen.

Mr. Neale stated that of 35 cans examined at Kingsbridge Terminus, 5 had loose lids, which would fall off if the cans were placed on their sides, and 4 had labels of ordinary paper. Of another batch of 21 cans, 4 had loose lids and 4 had no labels. The name of the originating station had, at one time, been painted on these cans, but this had been almost completely obliterated. It may be assumed that these were typical consignments.

The only remedy we can suggest with a view to reducing losses of cans to a minimum is that they should be marked in a permanent and easily discernible manner with a brass plate, bearing the name of the owner and of the originating station. This would help considerably to ensure that empty cans would not be returned to stations other than those of their owners. We consider rigorous insistence by the railway companies on the proper labelling of cans desirable.

It has been represented to us that the arrangements at many railway stations for the handling of cans are very unsatisfactory, and we think it essential that there should be provided, at all stations at which milk is received, adequate cool storage accommodation, where cans would be protected from dust and dirt, and from the sun, pending their being taken over by the consignees. We cannot but think that complaints as to the rapid souring of milk brought by rail are, to a large extent, due to the fact that the cans are frequently allowed to stand in the sun at railway stations without protection of any sort.

With regard to suggestions which have been made as to the provision of refrigerated vans, we fear that apart from any other consideration the cost of ice in this country would preclude their adoption. We think, however, that there is room for considerable improvement in the type of van at present employed for the transit of milk. In this connection, we understand that the subject of refrigerator vans is engaging the attention of a sub-committee of the Engineering Committee of the Investigation Board appointed by the Committee of the Privy Council for Scientific and Industrial Research.

Town Distribution.—To prevent the possibility of the overlapping of deliveries, which at present helps to render milk so costly, we are of opinion that town distribution should be on the lines adopted by the postal authorities in regard to the delivery of letters. This would render necessary in every town a central receiving depot, where the milk could be tested, and from which a district scheme of distribution could be organised. In the case of large towns a number of auxiliary depots would probably be required. Having regard to the fundamental importance from the point of view of the public health of a pure and adequate milk supply, we are strongly of the opinion that the provision of such a supply should not be a matter for private enterprise alone, and we consider that the time has come when municipal and urban authorities should be empowered to undertake this work, thus enabling a better supply of milk to be secured at a reasonable price. We understand that it is proposed to amend the Milk and Dairies (Consolidation) Act, 1915, so as to confer upon local authorities in England and Wales power to undertake the supply and sale of milk, and to provide the necessary buildings, plant, and machinery for handling, treatment, and distribution, and we recommend that similar powers should be conferred upon local authorities in this country. It is largely by the elimination of unnecessary distributive services that the price of milk to the consumer can be reduced. Of the alternative methods of securing such elimination, one, a combination of retailers and the pooling of their supplies, might tend to the creation of a monopoly and subsequently to the exploitation of the public, and the other, co-operation amongst bodies of consumers with a view to obtaining contracts for supply at a reasonable price, is not at present practicable on account of the extreme improbability that organised co-operative effort in this direction would be generally forthcoming. It is hardly necessary to point out that active participation in the supply of milk by a local authority would secure to a great extent to the consumer the benefits of co-operation. In addition to obtaining economy in distribution, the following advantages would be derived from such participation:—

(1). The undertaking of contracts for town supply would give a material stimulus to winter dairying, and would result in milk being obtainable in bulk at lower rates than those which could be secured by individual retailers.

(2). The fact that the local authority was itself directly concerned in the supply would tend to raise the general standard of quality of the milk. So far as we have been able to ascertain, the number of samples at present generally taken in urban areas with a view to safeguarding against adulteration is not nearly sufficient.

In this connection also, we feel that we must endorse the views expressed by many witnesses as to the inadequacy of the fines generally imposed in this country in cases of conviction for milk adulteration. Except in the case of one or two of the larger centres, magistrates do not, as a rule, appear to realise the responsibility which is vested in them in this regard, and fines of 1s. and 2s. 6d. are common. The imposition of nominal fines can never be effective in stamping out malpractices of the nature referred to, and we are of opinion that in all cases in which a conviction is obtained a very severe penalty should be inflicted.

We are glad to note the increasing publicity given by the Press in general to cases of conviction for adulteration, as there can be no doubt that such publicity acts as an exceedingly valuable deterrent.

(3). The system of purchase of milk for human consumption on the basis of its quality could be instituted. This we consider especially desirable. At present the producer of milk for town supply need only conform to the legal standard for butter-fat, *i.e.*, 3 per cent. (or even a lower percentage, provided he can prove that the milk is sold as it has come from the cow) and he is paid the same price as the producer of milk containing 4 per cent. or 4·5 per cent. of butter-fat. There is in consequence no inducement to the supplier to produce rich milk.

Testing and grading could be carried out at the central receiving depot.

(4). In poor or thickly populated districts, where people are willing to forego the convenience of having milk delivered at their doors, local authorities might consider the establishment of depots where milk could be sold over the counter at a price less than that charged for milk delivered.

(5). In the case of country towns, particularly those situated in non-dairying districts, arrangements could be made, if necessary, to obtain supplies from a distance by rail. At present the milk supply of such towns, especially in winter, appears to be much more inadequate than that of large centres, as the supplies forthcoming from local producers, on which these towns mainly depend, are frequently not nearly sufficient to meet the demand. Many farmers will not undertake the local supply of milk on account of the trouble involved in its distribution, with the accompanying fear of bad debts, etc. All this would be eliminated by the establishment by the urban authority of a central depot to which milk could be delivered, and we believe that the existence of such a depot would lead to a substantial increase in the amount of milk produced in the neighbourhood of these towns.

We have received interesting evidence as to the value of depots for the supply of milk to the poor established by voluntary effort in towns such as Galway and Mullingar. The successful working of these depots, limited even as they are in scope, encourages the belief that the widespread extension of the system would bring about satisfactory results.

SECTION IV.

EDUCATION AND RESEARCH.

The existing facilities in Ireland for education in regard to dairying briefly comprise :—

(1). A system of itinerant instruction by instructors appointed by the various County Committees of Agriculture.

(2). The courses in dairying provided at the various schools of Rural Domestic Economy, and at the Munster Institute and the Ulster Dairy School, for farmers' daughters.

(3). The provision by the Department of courses of training for creamery managers, butter-makers, and cheese-makers.

(4). An advanced course of four years' duration in dairy science at the Royal College of Science.

To consider first the instruction afforded under the county schemes, we are of opinion that it is insufficient to meet what must be regarded as a basic requirement, *i.e.*, the education of the rural producer as to the necessity for and best methods of producing clean milk. This is a matter of the highest importance, as without clean milk good dairy produce cannot be made, and this branch of the work has been hitherto somewhat neglected. It appears to us accordingly that at anyrate in dairying counties instructors should be available who would visit dairy farms in order to afford personal instruction in the production of clean milk according to the actual conditions prevailing on each farm; that is to say, to demonstrate what could be done with the facilities at hand and without additional outlay. In view of their existing duties neither buttermaking nor cow-testing instructors could be expected to carry out this work. Instructors of the type suggested could also advise farmers as to the most advantageous methods of disposing of surplus milk; at present, where such milk is available, more of it frequently goes to the feeding of stock than is, perhaps, always necessary, and instruction in the farmer's own home as to how to turn surplus milk into palatable hard or soft cheese would be of great advantage.

We do not know how far the suggestion that such itinerant instruction should be provided is feasible, having regard to existing training facilities, but we commend it to the consideration of the Department. We understand that some instruction of this nature is already provided for students at the Department's various Institutions, but so far as we are aware it does not appear to be given sufficient prominence in the curriculum. Moreover, a considerable time must elapse before the younger generation now going through these schools will be able to effect a general improvement on present methods of milk production and handling.

We come now to the other branches of dairying education. With regard to that provided at the Munster Institute and the Ulster Dairy School, we understand that the demand for admission to both these institutions is so great that applicants must wait two years in the case of the former and one year in the case of the latter before they can be admitted. It would accordingly appear that there is ample room for another school of this type, and we recommend that the Department should take the necessary steps with a view to its establishment. In our opinion, however, both the training provided at these schools and that provided for creamery managers, which consists of courses partly at the Royal College of Science and partly at a selected creamery, are capable of substantial improvement. Neither is sufficiently comprehensive, and this we believe to be due to the fact that under present conditions their scope cannot be sufficiently extended.

There is no question that in this country there is pressing need for a properly equipped institute, which will provide still higher and more specialised education than is at present possible, not only in the scientific, but also in the practical side of dairying; no scheme of training can be regarded as satisfactory which does not permit of both these aspects being dealt with side by side. We understand that a number of representative bodies connected with the Irish dairying industry have repeatedly asked for further and better facilities for education and research, but before research workers can be procured suitable training must be provided.

The immediate educational requirements of the country may thus be described as follows:—

(1). The establishment of a dairy institute, with a creamery and cheese factory, and experimental plant for condensing in bulk and drying milk, separated milk, and whey.

(2). Provision at such an institute for a practical and scientific training for persons of the following types:—

(*a*) Instructors in cow-testing and the production of clean milk. This must be regarded as the foundation of all other work.

(*b*) Creamery butter-makers and cheese-makers.

(*c*) Managers of creameries, milk depots, and cheese factories. The present course at the Royal College of Science for persons of this category is weak by reason of the separation between science and practice entailed.

(*d*) Short winter courses for existing managers and makers who desire to refresh their knowledge of any particular branch of their work.

We accordingly strongly recommend that the Department should be provided with a grant sufficient to permit of the establishment of an institute of the type indicated in the preceding paragraphs. We think such a grant should be obtainable from the funds at the disposal of the Development Commissioners.

Research.—With regard to the question of research, we are of opinion that so far as this country is concerned the subject cannot be satisfactorily approached until an institute such as we have described is available.

Research work may be roughly divided as follows :—

(*a*) Pure research, dealing with underlying or fundamental principles.

(*b*) Industrial research, dealing with the efficient application of principles.

(*c*) Routine laboratory work, dealing with the control of materials and processes.

Of these divisions, (*b*) and (*c*) could be carried out at the dairy institute provided laboratory accommodation was available. The work under (*a*) would be divided into pure laboratory work, involving no field work, which could be dealt with at the Royal College of Science, and laboratory work necessitating field work, which could be carried out at the proposed institute.

Provided it is found possible to establish this institute, we recommend that efforts should be made to obtain funds for research work either from the Development Commissioners or from the Committee of the Privy Council on Scientific and Industrial Research.

SECTION V.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS.

The following is a summary of our principal conclusions and recommendations :—

(1). During the past few years there has been a steady decline in the dairying industry throughout the country generally, the falling off in milk production being particularly marked in Ulster. It has not been possible to obtain evidence which would show that any general decline was noticeable prior to the period of the war.

(2). Of the factors which have contributed to the decline, the increasing difficulty of obtaining sufficient and reliable skilled labour must be regarded as one of the most important.

The labour problem, which is especially acute in districts in which large dairy herds are maintained, has several aspects, of which the chief are :—(*a*) Sunday labour, and (*b*) strikes, both "sympathetic" and "lightning." We consider that any solution of the labour question must be based on the creation of a better understanding between the dairy farmer and the labourer, and recommend that the whole problem of labour in relation to dairying should be referred to a conference between representatives of the farmers' and of the labourers' unions, with a view especially to arriving at agreement as to the terms on which Sunday work will be carried out, and as to the steps which might be taken to ensure that contracts will not be broken without sufficient notice and sufficient cause. The Department should take steps to arrange for such a conference.

We recommend that the District Wages Committees appointed by the Agricultural Wages Board should be empowered to arbitrate in cases of disputes.

(3). On the majority of Irish dairy farms there is scope for improvement in the arrangement of the homestead with a view to the elimination of unnecessary labour. Much could be done at little expense to render dairying more acceptable to the labourer.

It is particularly important that arrangements should be made on every dairy farm to ensure that an ample supply of water is available, and we commend to creameries the desirability of considering the provision, where necessary, of facilities for the sinking of wells on their suppliers' farms.

(4). Opinions as to the merits of existing types of milking machines are very varied, and we recommend that a comprehensive series of tests of such machines should be carried out by the Department, so that expert advice might be available for the dairy farmer as to the desirability of their installation.

(5). The high price of beef during the war period has induced many dairy farmers to turn from milk production to the raising of dry stock. This tendency has been accentuated by the difficulty of obtaining labour for dairying.

The relatively low price fixed for butter, hitherto the chief Irish dairy product, has reacted very unfavourably on the manufacture of this commodity. The encouragement given to the manufacture of cheese has helped to prevent the falling off in milk production from becoming more serious, but as butter-making is a key industry, it is essential in the interests of both the store cattle trade and the pig-breeding industry that it should not be discouraged. We recommend, accordingly, that in any steps which may be taken in future to regulate the price of foodstuffs, parity prices should be fixed for dairy produce generally, and that such prices should be established on a basis which would leave a return equal to that from beef or other farm produce.

(6). We are of opinion that the improvement effected in the beef-producing qualities of Irish cattle by the bulls selected for premiums under the Department's Cattle Breeding Scheme has been achieved at the expense of their milk yields. Special attention must, accordingly, be devoted in future to the grading up of the country's dairy stock, which are almost entirely Shorthorn in type, by the provision of pure-bred Shorthorn bulls of milking strain, and by the mating of such bulls with selected cows. Having regard to the importance of the store cattle trade we do not consider any amendment of the Department's Scheme so as to include emium purposes bulls of a purely milking breed, such as the Friesian, is to ommended.

ith a view to the Department's arranging for a satisfactory supply of pure-lairy Shorthorn bulls we recommend :—

(*a*) The supply of high-class stock bulls to private breeders at a nominal sum for hire.

(*b*) The extension of the Department's Loan Scheme so as to afford reasonable credit facilities to small breeders to enable them to purchase pure-bred high-class dairy stock (both bulls and cows).

(*c*) The increase to £30 of the premium for pure-bred dairy bulls with milk records on both sides of their ancestry. The Department's Cattle Breeding Scheme should also be amended to permit of such bulls standing for premium purposes for a longer period than four years, provided their service condition is sound.

(*d*) The establishment by the Department at their own farms of herds of pure-bred dairy Shorthorn cattle, to serve as centres from which both bulls and surplus females could be distributed.

7). We recommend the provision by the Department of grants to the principal ltural societies for prizes for pure-bred dairy Shorthorn cattle. In judging cattle, milk records should be given relatively more importance than shape appearance.

(8). In connection with the disposal of dairy bulls at shows and sales, we would suggest that the Department should request the societies or firms concerned to arrange for such bulls to be put up for auction before other animals, so as to afford persons desirous of obtaining one of these bulls an opportunity of bidding, with the prospect of being able to fall back, if unsuccessful, on a bull of the ordinary type.

(9). The improvement of cattle in this country is greatly handicapped by the far too general use of " scrub " bulls. We consider that only bulls which conform to an approved standard of quality should be approved for service, and recommend that the Department should take steps as soon as practicable to obtain the necessary powers, and to put into force a measure for the licensing of bulls.

(10). Farmers throughout the country do not yet appear to realise the great possibilities of cow-testing, and vigorous propaganda with a view to the widespread extension of the practice of keeping milk records is necessary. We consider that the Department should mainly direct their efforts towards the establishment of Cow-testing Associations of the Class B type, as there can be no doubt that associations of this class are more likely to be generally adopted than those of the nature of Class A. The present remuneration of supervisors is altogether inadequate, having regard to the importance of the work and the necessity for obtaining a good type of man, and we recommend that grants to associations should be on a basis which would ensure that no supervisor should be paid less than £150 per annum.

We consider that the existing scheme for the establishment of Cow-testing Associations should be amended with a view to securing as far as possible the co-operation of creameries.

(11). We are of opinion that the funds at the disposal of the Department for the improvement of dairy cattle are insufficient, and we strongly recommend that they should be very substantially increased, so as to permit of development on the lines we have indicated.

(12). Every effort must be made to educate farmers as to the necessity for retaining their best cows for breeding purposes. The practice of disposing of such cows on account of their present high prices, and retaining second or third-rate heifers to form the basis of future herds, cannot be too strongly condemned.

(13). It is desirable that dairy farmers who produce milk for town supply should so re-arrange their herds as to secure that a proportion of their cows would calve in the autumn or early winter months. At present the majority of calves in this country are born in the spring, which is a factor accountable to no small extent for the shortage of milk in the winter months. .

(14). The shortage during the past few years of imported feeding stuffs has adversely affected the production of milk, particularly in winter dairying districts. We think, however, that the effects of the shortage have been somewhat exaggerated. Every effort appears to have been made by the Department to secure for this country its fair proportion of the supplies available for the United Kingdom, and we think that in this respect they have been most successful. The imports of cotton and other cakes are now up to pre-war level, but the demand for all classes of feeding stuffs has been checked by their high prices. The attention of farmers generally might be directed to the feeding value of some of the more recently introduced and relatively cheap foods, such as dried grains, dried yeast, palm-nut cake, &c.

(15). Many dairy farmers do not appear to realise that practically everything necessary for the maintenance of a good milk supply can be grown on the farm. The remedy for decreased milk yields due to lack of imported stuffs lies in the adoption of a proper system of tillage. We are unable to agree with the view submitted by one or two witnesses that the Tillage Orders have been one of the chief causes of the falling off in milk production, by creating a necessity for the disposal of milch cattle. All experience would go to show that after one season their effect would be quite the reverse.

(16). We consider that the system of ensilage should be more widely encouraged, and recommend that the Department should carry out a scheme of experiments with a view to ascertaining the relative merits and economic possibilities of silage as compared with other cattle foods.

(17). There is general evidence as to the depreciation in the stock-carrying capacity of pastures owing to the scarcity of basic slag and superphosphate. While so far as quantity is concerned the conditions in regard to the former have somewhat improved, owing to alterations in the process of manufacturing steel farmers will in future be unable to obtain slag of such high grade as formerly. The supply of superphosphate, which is still inadequate, is dependent upon shipping facilities for the raw material. These are not yet very satisfactory.

(18). The evidence received regarding the effect of the restrictions on the export of milch cows and of in-calf heifers would show that these restrictions have not had the effect intended, but that, on the contrary, they have discouraged breeding throughout the country. We understand that the restrictions on the export of milch cows were withdrawn in April, 1919, and we recommend that the Order prohibiting the export of in-calf heifers should be rescinded.

(19). Contagious abortion is very prevalent, and the steps at present taken to combat the disease do not appear adequate. The fact that the Department will supply vaccine for the treatment of animals requires to be made more widely known. The present unrestricted movement of infected animals is very undesirable, and we recommend that the disease should be scheduled as notifiable.

(20). We have received no evidence which would show that there is in the country any general shortage of milk for human consumption, and where scarcity exists the lack of a proper system of distribution must be regarded as the chief cause. In the larger centres the demand for milk is regulated by its high price rather than by any inadequacy of supply. We have found that the prices fixed to meet the requirements of town dairymen in Dublin and Belfast have led to a tendency to increase prices throughout the country.

(21). We consider the system of town dairying altogether uneconomic, not only in that it raises the price of milk unnecessarily high, but in that it results in the serious depletion of the best dairy stock of the country. We are accordingly of opinion that milk for town supply should be obtained solely from rural sources.

(22). With a view to obviating losses of cans, where milk is sent by rail, we recommend that the various railway companies should insist upon cans being properly stamped with the owner's name, and with the name of the originating station. A large percentage of the losses at present must be attributed to defective labels. We understand that a proposal to charge for and waybill empty cans, thus rendering the railway company responsible for their satisfactory return to the senders, would be too costly to be acceptable.

(23). At all stations at which milk is received adequate storage accommodation should be provided, where cans could be protected from dust and dirt, and from the sun.

(24). There is room for considerable improvement in the system of milk distribution obtaining in Irish cities and towns. The adoption of a proper scheme is essential if a material reduction in the price of milk to the consumer is to be effected. We recommend, accordingly, that municipal and urban authorities in this country be empowered to undertake the supply and sale of milk, and to provide the necessary buildings and machinery for its handling, treatment, and distribution.

(25). We believe that participation by the local authority in the supply of milk would tend to raise the general standard of quality. The number of samples at present taken with a view to safeguarding against adulteration is altogether insufficient. In cases in which convictions for adulteration are obtained, the penalties inflicted should be much more severe than those at present imposed.

(26). We consider that milk for human consumption should be purchased on the basis of its butter-fat content, so as to encourage the production of rich milk.

(27). Local authorities undertaking the supply of milk might consider the establishment in poor or thickly populated districts of depots, where milk could be sold over the counter at a price less than that charged for milk delivered.

(28). We are of opinion that the establishment by the local authority in country towns of depots for the reception of milk would give a material stimulus to the production of milk in the neighbourhood of such towns.

(29). Under the schemes for education in dairying, provision should be made for the training of instructors who would educate the rural producer as to the best methods of producing clean milk, having regard to the actual facilities obtaining on the farm.

(30). There is ample room for another school of the type of the Munster Institute and the Ulster Dairy School, and we recommend that the necessary steps be taken with a view to its establishment.

(31). There is urgent need in this country for a properly equipped Dairy Institute, which will provide higher and more specialised education than is at present possible, both in the scientific and practical sides of dairying. At such an Institute, courses should be provided for (*a*) Instructors in Cow-testing and the production of clean milk ; (*b*) Creamery butter-makers and cheese-makers ; (*c*) Managers of creameries, milk depots, and cheese factories ; (*d*) "Refresher" courses for existing managers and makers.

We recommend that the Department should be provided with a grant sufficient to permit of the establishment of a Dairy Institute of the type indicated.

(32). We are of opinion that in this country the question of research cannot be adequately dealt with until a well-equipped Institute is available. If such an Institute is established, we recommend that efforts be made to obtain funds for research work either from the Development Commissioners or the Committee of the Privy Council for Scientific and Industrial Research.

We desire to place on record our great appreciation of the services of our Secretary, Mr. J. E. Hanna. Throughout the whole course of our Inquiry he has taken all possible steps to meet the convenience of the witnesses, and to see that the objects of the Inquiry were made known to everyone likely to be able to offer evidence of value. He has displayed marked ability and great industry in assisting us in every way, and in the drafting of the Report has given evidence of his thorough grasp of the very complicated question with which we have had to deal.

We have the honour to be,

Sir,

Your obedient Servants,

BERTRAM H. BARTON,
Chairman.

R. A. ANDERSON.

H. BARBOUR.

P. BRADLEY.

THOMAS DUGGAN.

A. LOCKETT.

J. E. HANNA, *Secretary,*

DUBLIN : Dated this Twelfth day of May, 1920.

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